

Abstract

A system for rapidly determining the presence or quantity of coliform bacteria in a water sample using the enzymes  $\beta$ -D-galactosidase and  $\beta$ -D-glucuronidase. The system includes a first filter means for separating bacteria from the sample and a broth for culturing the bacteria including an inducing agent for inducing enzyme production. A second filter means is used to separate the cultured bacteria from the broth. A lysing agent is exposed to the bacteria on the second filter and incubated with a chemiluminogenic substrate of the enzyme to produce a chemiluminescent product. Light emission is initiated from the second filter means and the emitted light is detected or measured directly from the second filter means using a luminometer adapted to receive the second filter means. The system is especially effective at improving the sensitivity and specificity of the assay by increasing the signal received from encapsulated target organisms and reducing the interference from non-target organisms that may be present in the sample.